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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HO, ALLEN C	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/064,541	ARENSON ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15,17-30 and 32-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,17-30 and 32-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 May 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **48** (paragraph [0031], line 1), **50** (paragraph [0029], line 9). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: **100** (Fig. 3). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the entry cursor and the target location cursor claimed in claims 3, 4, 19, and 20 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the angular current profile claimed in claims 14, 15, and 30 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities:

Paragraph [0037] should be deleted since Fig. 6 has been deleted.

Appropriate correction is required.

Claim Objections

6. Claim 32 is objected to because of the following informalities:

(1) Line 8, "operates" should be replaced by --operating--.

(2) Line 10, "controls" should be replaced by --controlling--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-15, 17-30, and 32-36 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for determining an entry location of a physician's hand, does not reasonably provide enablement for an entry location other than a physician's hand, for

example, the entry location of an x-ray beam. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claims 1-15, 17-30, and 32-36 recite "an entry location", which is broader than an entry location of a physician's hand.

9. Claims 1-15, 17-30, 32, and 35-36 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for emitting x-rays and controlling x-ray intensity, does not reasonably provide enablement for emitting radiation and controlling radiation intensity. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

1-15, 17-30, 32, 35, and 36 recite "emitting radiation". As understood by persons skilled in the art, radiations comprise a broad spectrum of electromagnetic and particle fields. The only kind of radiations generated by the CT disclosed by the applicants are x-rays. Specifically, x-rays are generated by an x-ray source (**4**). The applicants failed to describe generating means for other forms of radiations.

10. Claims 1-4, 6-15, 17-20, 22-30, 32, 35, and 36 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a fluoro/CT system, does not reasonably provide enablement for other imaging systems. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claims 1-4, 6-15, 17-20, 22-30, 32, 35, and 36 recite "an imaging system", which is broader than a fluoro/CT system disclosed by the applicants. There are imaging systems which do not have a radiation source that moves around a patient. For example, the method disclosed by the applicants cannot be generalized to include a handheld ultrasound imaging system, or x-ray imaging using a film cassette.

11. Claims 14, 15, and 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 14, 15, and 30 recite "angular current profile". It is not clear what is this current, and how it is determined.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 33-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 33-36 claim both an apparatus and the method steps of using the apparatus, and is indefinite under 35 U.S.C. 112, second paragraph. *In re* Ex parte Lyell, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990). MPEP § 2173.05 (p).

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1, 2, and 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Gono *et al.* (U. S. Patent No. 5,873,826).

With regard to claim 1, Gono *et al.* disclosed a method for reducing radiation exposure from an imaging system comprising the steps of: determining an entry location (between ϕ_1 and ϕ_2); operating the imaging system so as to cause the imaging system to emit radiation (**1b**) having a radiation intensity (inherent); controlling (**4**) the radiation intensity in a manner responsive to the entry location so as to create image data (see steps shown in Fig. 4); and processing the image data to create processed image data (column 4, lines 15-17).

With regard to claim 2, Gono *et al.* disclosed the method of claim 1, wherein the determining step includes determining the entry location (in terms of gantry angular range of the x-ray source) relative the imaging system.

With regard to claim 5, Gono *et al.* disclosed the method of claim 1, wherein the entry location is determined in a manner responsive to a FluoroCT scan (column 1, lines 38-42).

With regard to claim 6, Gono *et al.* disclosed the method of claim 1, wherein the imaging system includes an object cavity (inherent for a CT) and a radiation source (**1b**) having a gantry angular position (ϕ), wherein the radiation source is rotatably associated with the imaging system

so as to rotate around the object cavity, and wherein the entry location includes an entry angular range (between ϕ_1 and ϕ_2).

With regard to claim 7, Gono *et al.* disclosed the method of claim 6, wherein the operating step includes operating the imaging system so as to cause the radiation source to rotate around the object cavity (inherent for a CT).

With regard to claims 8 and 9, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is decreased by a predetermined minimization amount when the gantry angular position is within the entry angular range (Fig. 9), wherein the predetermined minimization amount is equal to the radiation intensity (corresponding to a tube current of 200 mA).

With regard to claim 10, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is increased by a predetermined minimization amount (corresponding to a tube current of 200 mA) when the gantry angular position is within 180 degrees of the entry angular range (Fig. 9).

With regard to claim 11, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is increased by a predetermined minimization amount (corresponding to a tube current of 200 mA) when the gantry angular position is within 90 degrees of the entry angular range (Fig. 9).

With regard to claim 12, Gono *et al.* disclosed the method of claim 6, wherein the operating step includes operating the imaging system so as to determine a radiation absorption angular profile (x-ray absorption/attenuation data for 3D reconstruction), wherein the radiation

angular profile is responsive to the gantry angular position (This is inherent, since this is what a CT is designed to do).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 17, 18, 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gono *et al.* (U. S. Patent No. 5,873,826) in view of Zmora (U. S. Patent No. 6,028,909).

With regard to claims 17, 18, 21-28, Gono *et al.* disclosed the method of claims of 1, 2, and 5-12. However, Gono *et al.* failed to teach a medium encoded with a machine-readable computer program codes that implement the method of claims 1, 2, and 5-12.

Zmora disclosed a method for CT imaging in the form of a computer readable medium. Zmora taught that a method for a computer-based system could be carried out using software, which could be upgraded as needed (column 8, lines 24-29).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the method in the form of a computer program stored on a computer-readable medium, since a person would be motivated to modify and/or improve on the method as needed.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(1) Köhler *et al.* (U. S. Patent No. 6,435,717 B1) disclosed an x-ray device that monitors the radiation zone.

(2) Bittl *et al.* (U. S. Patet No. 6,385,280 B1) disclosed an x-ray CT that modulates the x-ray power depending on an angle attenuation profile.

(3) Wilting *et al.* (U. S. Patent No. 6,094,468) disclosed an x-ray CT that adjusts the x-ray source on the basis of a density value of the object.

(4) Horiuchi (U. S. Patent No. 6,067,341) disclosed an x-ray CT that uses a scout image to determine the condition for tomographic imaging.

(5) Popescu *et al.* (U. S. Patent No. 5,867,555) disclosed dose modulating during CT scanning.

(6) Popescu (U. S. Patent No. 5,822,393) disclosed a method for adaptively modulating the power level of an x-ray tube of a CT system.

(7) Hsieh (U. S. Patent No. 5,696,807) disclosed method and apparatus for modulating x-ray tube current.

(8) Swerdloff *et al.* disclosed a graphical interface for a treatment planning softward comprising a manual cursor control device.

(9) Williams *et al.* (U. S. Patent No. 5,485,494) disclosed modulation of x-ray tube current during CT scanning.

(10) Toth (U. S. 5,457,724) disclosed an x-ray CT system that uses a scout image to determine geometric scan parameters.

(11) Toth *et al.* (U. S. Patent No. 5,450,462) disclosed modulation of x-ray tube current during CT scanning.

(12) Toth (U. S. Patent No. 5,400,378) disclosed dynamic dose control in multi-slice CT scan.

(13) Toth (U.S. Patent No. 5,379,333) disclosed an x-ray CT system that modulates x-ray tube current as a function of gantry angle to reduce the total patient dose without significantly increasing image noise.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho

Allen C. Ho
Patent Examiner
Art Unit 2882

ACH